

Unique Test Provides Confidence in Containment

Sandia made the news last week with the announcement of a successful test-to-failure of a scale-model nuclear power plant containment building.

The test was simple in concept but challenging in execution, rewarding in data, and far-reaching in importance for the nuclear power industry and the Nuclear Regulatory Commission (NRC), which sponsored the test.

All U.S. nuclear power plants are housed in massive, dome-shaped concrete and steel containment structures. Although all the computer models suggest that the buildings do indeed have a reserve margin well beyond their design pressure, no one has ever actually subjected a reinforced concrete containment building to overpressures severe enough to cause the system to fail.

So the concept was simple — build one, raise the pressures inside enough to make it fail, then note how much pressure it withstood and where and how it failed.

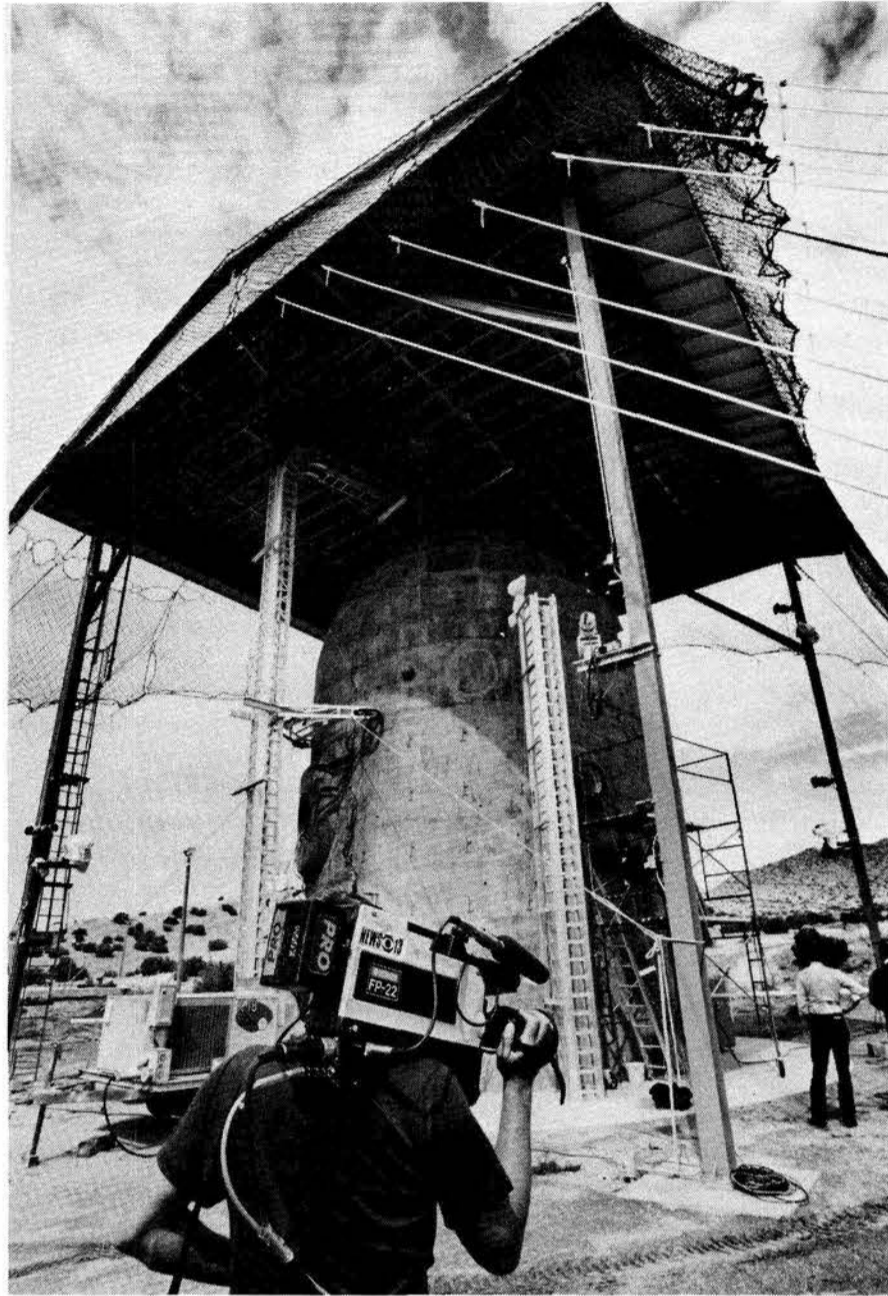
Execution was somewhat more challenging. Members of Containment Integrity Div. 6442, under Walt von Riesemann, had a one-sixth scale model of a containment building constructed out in Lawrence Canyon. (That scale represents the smallest that could conveniently be built with typical steel reinforcing rods, or "rebars," and concrete with aggregate.) Even at one-sixth scale, the model was 37 feet tall and 22 feet in diameter — full-scale structures are massive.

The model had a 7-in.-thick concrete dome atop a nearly 10-in.-thick concrete cylinder. It housed a steel liner (the pressure boundary) and a typical complement of equipment hatches, valves, and airlocks that allow operator entry and exit. All in all, the test structure followed the same design criteria used in actual reactor containment structures. It was designed to withstand an internal pressure of 46 pounds per square inch (psi), which is typical for this type of containment.

They then instrumented the model with hundreds of strain gages, displacement transducers, thermocouples, still and video cameras, and an acoustic-sensing system to measure the response of the structure as the pressures climbed inside it.

After a series of preliminary tests, nitrogen gas began filling the structure on the morning of July

(Continued on Page Six)



PRESS TOUR last week allowed members of the media to view the scale model of the containment building tested. Visible halfway up the cylinder on the left side is a bicycle-wheel apparatus that could circle the structure and allow video cameras housed in the steel grid to provide zoom-in TV coverage of areas of interest.



LAB NEWS

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SANDIA NATIONAL LABORATORIES

AUGUST 14, 1987

Physics, Medicine, Space

Foams Forecast: Widespread Interest, Unusual Applications

Artificial veins, artificial skin, a spaceborne comet-dust collector. The stuff of science fiction?

Perhaps not. Sandia-developed polymer foams with cell sizes a tenth to a thousandth as big as those in typical foams may be key to these — and many other — applications.

Conventional polymer foams, such as the coffee cup made of polystyrene plastic, have cells (air pockets) about 100 micrometres (about 0.004 inch) in diameter — almost big enough to see without a magnifying glass (see "How Big's a Micrometre?"). Sometimes, however, the cell walls of such foams have much smaller pores, or "microcells."

"The foams we developed consist entirely of these microcells," says Jim Aubert (1813). "Not only are the cells extremely small — we've made polystyrene foams with a cell size as small as 0.1 micrometre — but the cells are very uniform in size and evenly distributed. This results in a low-density, porous material that's structurally uniform and has a high surface area."

(Surface area is usually reported as the surface

area per unit volume; the smaller the cells, the larger the surface area per unit volume. Put another way, you can put more BBs than basketballs inside your Buick — and you'll have more surface area too.)

Variety of Applications

The new foams are attractive for a variety of applications, Jim points out. "In fact, every month or two we hear of another possible use for them," he says. "And there may be lots of other applications that we don't know about yet."

A patent on the new foams was issued to DOE in June in the names of Jim and four other Sandians: Roger Clough (1811), John Curro (1813), Carlos Quintana (6254), and Ed Russick (1813). Montgomery Shaw of the University of Connecticut, who was on sabbatical leave at Sandia during early stages of foam development, is also named on the patent.

The technique for making the new foams can

(Continued on Page Five)

Oneness, Openness, and Overseas

Sandia 'One of My Most Exciting Jobs'

Art Davie has only one regret about his 27-month tenure as VP of Administration 3000 — it wasn't long enough.

And, given the Davie durability scale, he spent a long time at Sandia — he's now heading for his 17th new job in his 24+ years of AT&T service. He'll be second in command to Rob Dalziel, head of AT&T International in Brussels, Belgium. "He's asked me to be his deputy and alter ego," says Art. "And while he's directly managing AT&T's efforts in most of Europe, I'll be responsible for AT&T's work in the Scandinavian and Benelux countries and in the Middle East and Africa — which translates, currently, as Saudi Arabia and Egypt."

(Dalziel, coincidentally, was just two years ahead of Heinz Schmitt, 5100, when they attended Brooklyn Polytechnic Institute.)

"Sandia is a wonderful place — with a high reputation, tremendous capabilities, dynamic peo-

(Continued on Page Four)

Antojitos

Significant, But Sure Not Spectacular The recent overpressurization test of a miniature (if anything nearly 40 feet tall can be called miniature) nuclear reactor containment building was a resounding success from the data-gathering point of view.

But it failed as drama when compared to the crash tests of the mid-70s. Now those were exciting — "Jump, you fool, jump!" you found yourself muttering as you watched a locomotive racing down the tracks at 80 mph with a massive concrete barrier just milliseconds in front of it. (Yes, you knew, but only intellectually, that the engine had no engineer for this its final run.)

So what's an overpressurization test? All the work gets done months earlier so the test itself just means pumping a gas into the 11,000-cubic-foot structure, standing back a safe distance (just in case it might explode), and waiting. And waiting.

Finally, it does fail, not with a bang but a whisper. Dramatic it's not. But significant it is — and just as important in size and scope as the crash tests. The pressure test gave the nuclear power industry some reassuring information: Its computer models are reasonably accurate.

Yes, \$4 million sounds like a lot of bucks to make a 20-inch rip in a steel liner. But think of it this way — amortize that \$4 million over the number of reactors it covers and the number of years the information will be useful. Cheap at twice the price. Someday the Sandia test will be looked back upon as a major milestone in the history of the industry.

* * *

Congrats are offered elsewhere in this issue to the Goodsons, (Isabel, 7861, and Richard, 7841) on the birth of a daughter, Bethany Alise (a beautiful name, incidentally, and I don't say that just because I have a degree from a Bethany College). I'm noting her arrival here because she's the first girl born to the Goodson family in 150 years.

* * *

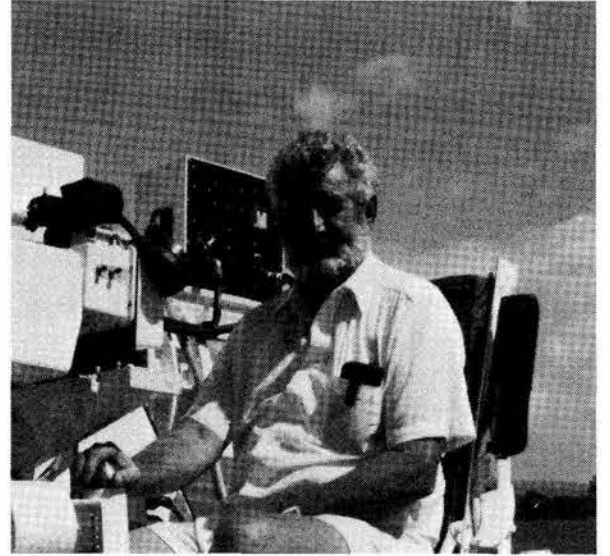
Over Here, We Don't Care What You Do — as long as you spell it correctly. And, last issue, I didn't: "Apocryphal" came out as "apochryphal." (Thanks, sharp-eyed weapon developer David E.) The word comes from "Apocrypha," the books "of dubious authenticity" included in some versions of the Bible but excluded from the more rigorously selective versions. It's come to mean "may be true, but probably not."

●BH

* * *

Time for an Apocryphal Story: According to the Ragan Report, a Delta Air Lines employee overheard this conversation in Atlanta —
First Person: Jennifer refuses to use the word processor.
Second Person: Really? What word does she use?

Supervisory Appointments



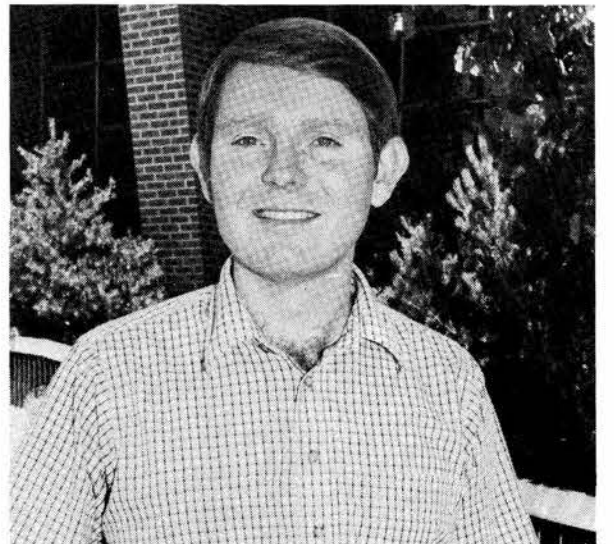
JACK CANUTE to supervisor of KTF Range Support Section 7523-1, effective June 1.

Jack joined the Labs in May 1956 as a member of the Field Test Division where he worked on payload telemetry systems for warheads. He went to Hawaii in 1962 to participate in Operation Dominic and has been there ever since, except from 1964 to 1965 when he was at SNLA. He was project engineer for the high-resolution telemetry testing for airborne diagnostics systems project in Kauai at that time, traveling back and forth. Jack has worked on telemetry for systems such as Betty, Lulu, Hotpoint, Asrock, Astor, and Highcard. He was a member of the Rocket Range Systems Division when he was promoted.

He has an AS in applied sciences from Capitol Radio Engineering Institute. He served with the Navy from 1942 to 1948 and was recalled to active duty from 1950 to 1951. He was with the civil service in the Navy Department and the Pentagon from 1948 until 1955.

In his spare time, Jack enjoys golfing, hiking, and deep sea fishing. He and his wife Marge have four children and live on the beach in Kekaha, Kauai.

* * *



REGAN STINNETT to supervisor of Ion Beam Experiments Division 1264, effective July 16.

Regan joined Sandia in January 1978 as a member of the Target Experiments Division of the Pulsed Power Research Dept. In 1979 he moved to the Pulsed Power Research Division. He then went to the Power Flow Research Division in 1980, where he was project leader for power flow studies. In 1986 he joined the Pulsed Power Components Division where he served as project leader for the Delphi Accelerator.

In 1982 Regan received a patent on negative ion production in magnetically insulated transmission lines.

He has a BS in physics from Northeast Louisiana University and a PhD in plasma physics from the University of Texas at Austin. He is a member of the American Physical Society and the IEEE.

In his spare time, Regan enjoys skiing, jogging, traveling with his family, and church activities. He and his wife Susan have two children and live in Four Hills.

feed back

Q. What are the proper circumstances under which a personal computer may be taken home? I

know of an employee who has taken a Compaq home so that his wife can write a book. Is this proper use of government property?

A. All Sandia property is owned by the U.S. Government and is intended to be used for official business only. By taking a Sandia personal computer home for any purpose other than to work on authorized Laboratories' programs, an employee is violating Sandia's policy regarding proper use of its property. See SLI 6900, page 1, which describes this policy.

Any employee having knowledge of possible misuse of Sandia property should report it immediately to the Materials Systems, Audits, and Investigations Division 3431, 4-7069. The caller may remain anonymous.

Jim Martin - 3400

Q. Why does Sandia continue to allow contract personnel with temporary stickers (from six months to a year) and other Kirtland and Sandia personnel with permanent stickers to continually park all day in the visitor parking area? It's time that a sign be posted and violators be ticketed.

A. The Sandia Security force makes every attempt to respond to complaints regarding traffic and parking problems. We do not patrol the parking areas on a set routine, but we do monitor the lots as Security priorities permit. Contractors are not permitted to park in spaces designated for visitors; when observed doing so, they are ticketed. Please report violations observed to the Security Panel Room, telephone 4-4657 or 4-4658.

Jim Martin - 3400

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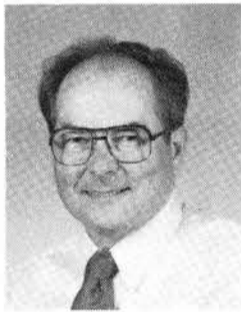


PLUME SENSITIVITY workshop at Sandia Livermore July 21-22 attracted some 110 participants from 30 organizations, including staffers from 8240, 8340, and 8430 who are active in modeling rocket plumes. Moderator Don Sweeney (8435), right photo, noted that a large part of the national plume phenomenology community attended the workshop. Three workshop leaders, left photo, were (from left) John Vitko (8430), Phil Kessel of the Air Force Astronautics Lab, and Fred Simmons of



Aerospace Corporation. They covered high altitude, low altitude, and experimental data on standard rocket plume codes. The workshop brought together people who have experience developing state-of-the-art plume signature codes and those who use the codes for system design. They discussed the ability of these codes to adequately predict plume features for various missions. Hosted by Sandia, the workshop was sponsored by the Air Force Astronautics Laboratory.

Supervisory Appointment



DON DUBOSE to supervisor of Joining Laboratories Section 8184-3, effective July 16.

Don joined Sandia at Livermore in 1962, first working in the manufacturing liaison section for 10 years. Since then he has provided tooling support for the model, powder metallurgy, organics, hybrid integrated circuits and joining labs.

He has an AA degree in manufacturing technology from Contra Costa College, and served there as an instructor in the evening program in Machine Shop Technology for 13 years.

For the past 10 years Don has served as an elected representative on the board of directors of the Pacific Reefs Water District in Mendocino County; he has an ocean front "pre-retirement" home at Albion. Other interests include saltwater fishing, skin and scuba diving, and membership in Livermore Masonic Lodge #218. He and his wife Virginia, a Computation Department secretary at LLNL, have four children and six grandchildren.

Take Note

Dan Bozman (8153) served as a judge for the DOE Special Awards Program at the recent 38th International Science and Engineering Fair in San Juan, Puerto Rico. Some 700 projects were entered by outstanding high school students from around the world. Judging was done by scientists and engineers from DOE and DOE contractors across the U.S. Winners received cash and other special awards, including computers, college scholarships, orientation weeks at national R&D facilities, and summer jobs. The Awards Program recognizes science fair competitors who have developed energy-related projects. Dan is already looking forward to next year's fair in Knoxville, Tenn.

Congratulations

To Karen Quock (8261) and Harry Davis, married in Virginia City, Nev., July 25.



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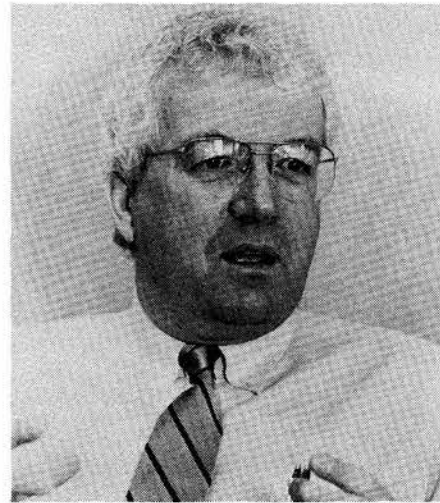
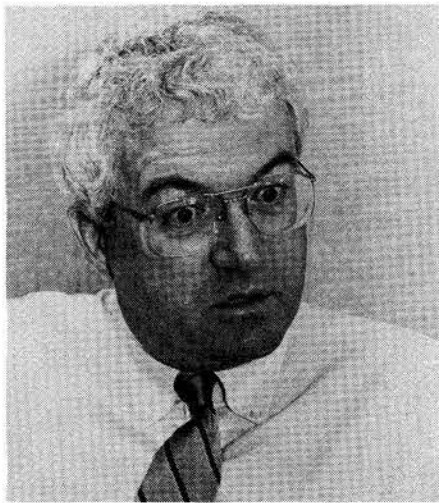
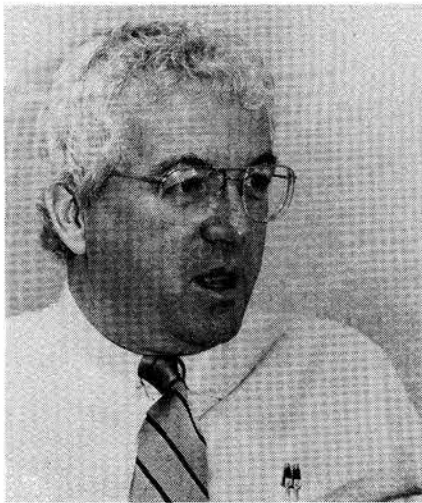
MARKSMEN from Sandia security contractor Advance Security, Inc., captured 12 of the 20 trophies at the DOE Regional Small Arms Tournament at LLNL's Site 300. Winners were (from left): Inspectors Robert Allen (1st place in Tactical Oriented Stress Course and 5th in Action Revolver Course), Jerry Creager (1st in Marksman Pistol Course), Major Donald Gross (3rd in Tactical Oriented Stress Course and 4th in Action Revolver Course), Inspectors Richard Kirchgatter (3rd in Sharpshooter Police Pistol Course), Mark Lindstrom holding plaque as overall tournament champion (1st in Expert Police Pistol Course, 2nd in Tactical Oriented Stress Course, 3rd in Action Revolver Course), and Tom Clark (5th in Tactical Oriented Stress Course). ASI winners not in photo included Greg Sukel who got a 6th in the Action Revolver Course, and Jerry Weber who won a 2nd in the Marksman Police Pistol Course. Other participating teams were from LLNL, UC Berkeley, and DOE.

Scrabble for Unforgettable Names



Some small companies on the Nasdaq, home to more than three times as many companies as trade on the New York Stock Exchange, have... a trading symbol that nobody who learns it is apt to forget. Thus, Occupational-Urgent Care Health Systems Inc.

trades as OUCH; Roadrunner Enterprises Inc., a flat-bed trucking company, is BEEP; and Adtec Inc., which makes bars and detention equipment for prisons, is JAIL... There are such mnemonics as PAIN, CURE, CARE, and HEAL for health companies; BUGS and PEST for biological- and pesticide-research concerns, and WORM for a farm-equipment company. Priscilla Ann Smith, *Wall Street Journal*



ART DAVIE reviews his 27 months at Sandia.

(Continued from Page One)

Art Davie

ple," Art notes. "So I've really enjoyed my work here.

"And, more specifically, it's been a real pleasure to work with all the administrative groups [Controller 100, Computing 2600, all of Administration 3000, and the similar functions at Livermore] and Plant Engineering [7800] as well. They're full of creative people with a lot of desire to do a good job."

So what does a VP do in 27 months? "Establish a direction," says Art. "I guess you could call it a 'oneness.' That is, I've tried to tailor all of Administration to view itself as a coherent whole, not as a collection of disparate directorates and departments.

"And it's important to understand that this oneness, this unity of purpose, is not something I attempted to impose on Administration for its own sake. Rather, it grew out of the need for each organization within Administration to be part of the Sandia team, performing a valuable service and performing it well."

Who We Are, What We Do

The primary means of establishing this direction was, and continues to be, strategic planning. "We needed a common focus," Art points out. "I had no preconceived notion of where we should be going [with regard to strategic planning] or of how we ought to get there. But I knew that our direction was somehow engrained in the way we in Administration do business and that any planning had to be woven into the existing fabric of Administration.

"So, with the help of Warren Klein [3523], I held a series of meetings with the directors, who then met with their managers and supervisors to focus on

basic questions: What's your purpose? More important, what is the reason for your existence as an organization? In other words, 'Who are we? What do we do? Why do we do it?'

"We'll use the answers to those questions to define how each organization fits into the administrative framework," Art continues. "It's taken months to get where we are today. And the planning will continue. But that's as it should be — really, the *process* is more important than the plan itself. It's the concept of thinking ahead, and thinking together, that's important."

Open Communication Climate

Another of Art's efforts at Sandia is less apparent but may have even more impact on the Labs as a whole. That's his conviction that Sandia's communication climate should be as open as possible. "My background is in accounting," says Art, "so here's the way I look at it: DOE owns everything; Sandia has no assets — except its people.

"The traditional task of a manager is to enhance the value of a company's assets. Well, in Sandia's case, that means its employees. Openness of communication, candor, willingness to discuss the tough issues — those are ways of enhancing our assets."

"After all, we pride ourselves in hiring the best possible people to work at Sandia," Art continues. "We provide them with tremendous opportunities to grow, to become even better, once they're here. So it follows that we should treat them as if they *are* the best. And that means being open with them in every way possible."

Art doesn't claim singlehanded credit for warming the communication climate, of course; in fact, that change began well before Art took office in 3000. But during his tenure, Sandia has continued to make improvements — the LAB NEWS, for example, has for the first time discussed in some depth such touchy

topics as wage and salary administration and policy, the job evaluation system, performance reviews, and the benefits package. In the future, employees will hear more about the threat to security that could be caused by a disloyal insider, a topic seldom discussed in the past. And Art has pushed the supervisors he oversees toward a higher level of openness with their employees.

"I also believe that Small Staff is quite open to new ideas, new ways of thinking," he adds. "That's good — we owe it to our employees to be as open as possible."

Another way of enhancing Sandia's assets — its employees — is, Art believes, exemplified by his own career: "You broaden people's perspective by moving them around. Rotation provides them with a diverse basket of experiences. And that's valuable to them and to the Labs."

(Had he stayed longer at Sandia, his next step would have been "to see if we could unburden the system, provide more opportunity for our administrative folks to assume more responsibility and to be more creative," to use his words. "Maybe we've got too much bureaucracy, too much management, that stifles individual initiative in the administrative ranks.")

Sandia, Five Years Down the Road

"Sandia will probably change," Art predicts. "And that's good — we have to be responsive to our customers. The world around us will change, and that will alter the demands on our resources, causing us to focus on new initiatives and change others."

But, he concludes, "Sandia's basic qualities, its culture, the heritage that drives us won't change — I hope. It's these things — and the people that embody them — that have made my Sandia job one of the most exciting jobs I've ever held." •BH

Fun & Games

Chess— Chess master Ron Kensek (1231) won first place in the "Tall in Texas" Chess Tournament in Amarillo, Tex., on July 25-26. He scored 4-1/2 out of 5 points. Ron has been playing tournament chess since 1973.

* * *

Bowling— All bowlers are invited to attend the SANDOE Bowling Association Bowler-of-the-Month Awards tonight at the Coronado Club Eldorado room at 5 p.m. Refreshments will be served. Call Dora Gunckel on 6-0835 for more information.

* * *

Tennis— The Sandia Tennis Association (STA) raised some rackets at the tournament held at the Coronado Club July 25 & 26, and courted the following results. In Men's A Singles, Jeff Tsao (1141) defeated Ken Hanks (7866) 6-3, 7-6; Men's A Doubles, Ken Hanks (7866) and Mark Tucker (7544) defeated Paul Percy (1140) and Mark Percy 6-2, 3-6, 6-2; Men's B Singles, Tom Goolsby (7531) defeated David Smallwood (7544) 6-1, 6-0; Men's B Doubles, Steve Rivera (3434) and Paul Dipaola defeated Ward Bower (6223) and Scott Devonshire (2363) 6-1, 4-6, 6-2; Women's Singles, Samantha Lapin defeated Judy Hansen (1420) 6-1, 6-2; Women's Doubles, Terry Martinez (1250) and Charlene

Schaldach (2645) defeated Kay Goss (DOE) and Samantha Lapin 6-2, 6-4.

* * *

More Tennis— Don't miss the annual STA Labor Day Weekend Tennis Tournament Sept. 5-7 at the Coronado Club courts. Events include Men's A and B Singles, Women's Singles and Doubles, and Mixed Doubles. Entry fee is \$3/person per event for STA members, and \$6/per person per event for guests. For more information, call Paul Percy (1140) on 4-4309, Cathy Percy on 275-8486, or Pat Fleming (9243) on 4-2386.

* * *

Horseshoes— Sandia ringers, leaners, clangers, and thudders are invited to turn out tomorrow for the 28th Annual Sandia Labs Horseshoe Pitching Tournament sponsored by the Coronado Club at the Los Altos Courts at 4 p.m. There are no entry fees. Classes — four or five of them — will be decided by previous pitching averages. Officials will also set up women's and retirees' brackets if enough contestants turn out. Liquid refreshments will be provided at the pits. For more information, contact Tom Town (5151) on 4-8801, Joe Rodzewich (2854) on 6-0562, or Lupe Massoth (2632) on 4-8670.

feed! kiback

Q. Now that one row of car pool parking has been restored in the lot west of Bldg. 800, how about providing a security officer from 6:30 to 8 a.m. for a couple of weeks to "retrain" people who now are ignoring the car pool signs. I have been parking in that lot — and legally using car pool parking — and I can assure you that most of the cars parked in car pool slots are driver-only cars. Also periodic spot checks by Security as a follow-up would make sure that some of these lazy people would not return to using the slots after the initial surveillance period.

P.S. Please, no old song and dance about car-poolers "policing" the lot themselves. I just spoke to a member of 3400 who told me about all the unsolved cases of auto vandalism, tire slashings, etc., and I do not wish to take a chance of that sort of retaliation.

A. Security will patrol the parking lot areas to enforce parking when priorities and regular Security duties permit. Individuals reporting violations are never identified to the violator. There is no evidence to indicate that vandalism or malicious mischief has been directed toward anyone as a result of reporting violators.

Jim Martin - 3400

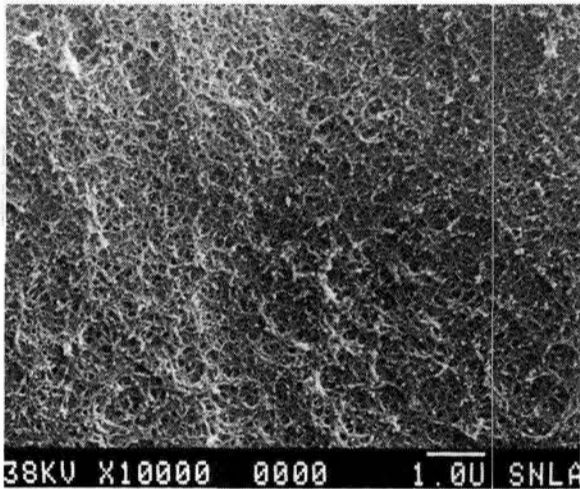
Foams

be applied to any polymer for which suitable solvents can be found, Jim explains. (A polymer is a chemical compound or mixture of compounds that consists of repeating structural units.) The polymer solution is cooled rapidly in a controlled way, which results in phase separation of the solution (that is, the polymer and solvent separate). Cooling continues until the solvent and/or the polymer freeze (at temperatures as low as -100°C), and thus are immobile. The solvent is then removed by either freeze drying or extraction, leaving behind a microcellular polymer foam.

"We've been able to make a variety of foams for different applications by controlling variables in the process," says Jim. "For instance, a foam's density depends on the concentration of polymer in the solution. If polymer concentration is low, the resulting foam has relatively low density. On the other hand, higher densities result if polymer concentration is relatively high."

Also, according to Jim, fine-tuning thermodynamic variables during the process affects both foam structure and cell size, so it's possible to make foams with varying characteristics.

Some of the first applications for the new microcellular foams have been in physics experiments at Sandia and other national laboratories. For inertial confinement fusion experiments, a porous micro-



MICROSCOPIC IMAGE of microcellular polystyrene foam, magnified approximately 10,000 times. The bar at lower right is 1.0 micrometre long. The cells are as small as 0.1 micrometre, a thousandth the size of cells of conventional polystyrene.

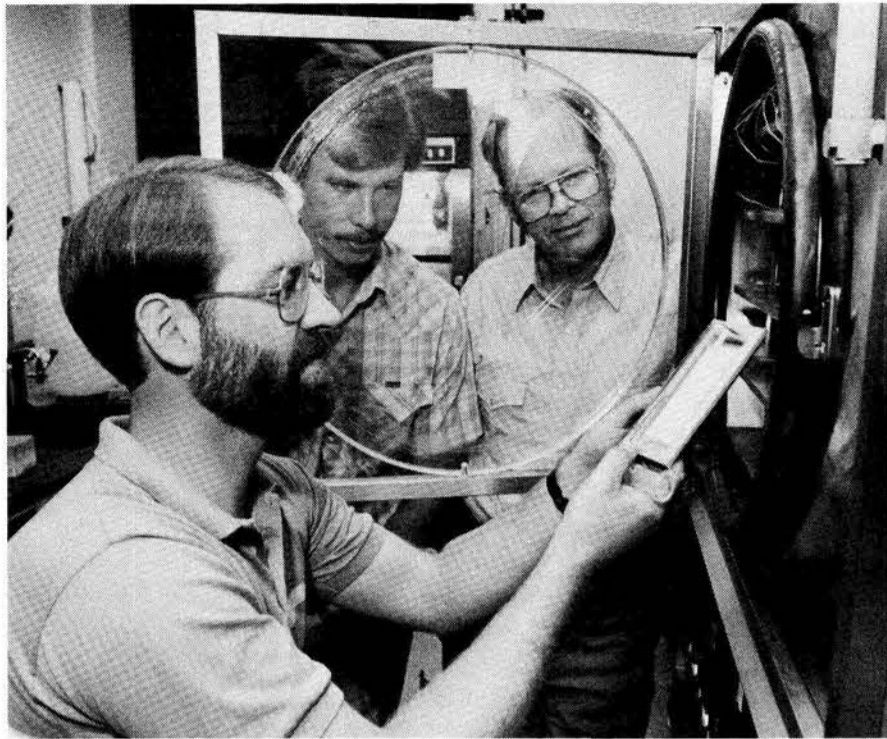
cellular foam would act as a sponge to hold liquid deuterium-tritium fuel in place in the target area.

In experiments using a pulsed-power accelerator as an X-ray laser pump, Sandia has used ultra-low density microcellular foam — developed by Peter Rand and Orié Montoya (both 1813) — as the X-ray laser target. The foams have also been successfully used in gas-puff implosion experiments on Sandia's PROTO-II accelerator.

(These foams, made from water-soluble polymers, are extremely fragile; to avoid machining them, they're molded to the desired shape — tiny rods, half rods, and rings — during formation.)

Alan Sylwester (1811), Peter, Jim, and others are working on a related program to develop carbonized microcellular foams with high surface areas. A patent is pending on the process to make these carbon foams. At the outset, the process involves preparing a microcellular foam of the polymer polyacrylonitrile (PAN). The PAN foam is then carefully heated to high temperatures (600 to 2400°C), resulting in a carbon foam having the same structure as the polymeric foam predecessor. "These carbon foams have a lot of special properties that present many unique applications," says Alan. "They have excellent dimensional stability and are chemically unreactive."

Alan has developed two processes for coating the carbon foam surfaces with catalytic metals. Many commercial processes depend on catalysts. It's theorized that, as supports for catalysts, the new carbon foams — because of their large surface area and porosity — may contribute to the speed and effectiveness of chemical reactions.



ALAN SYLWESTER (1811, foreground) removes microcellular foam sample from freeze dryer as Jim Aubert (1813, center) and Peter Rand (1813) look on. Freeze-drying removes solvent from foam during the foam-making process.

How Big's a Micrometre?

Imagine the difference between a mile and the thickness of a dime.

That's about the same difference as between a metre (39.4 inches, or a little more than a yard) and a micrometre, a millionth of a metre. (A micrometre is often called a micron, though micron is a term frowned upon by metric purists.)

The new foams' microcells can be just 0.1 of a micrometre, or one ten-millionth of a metre — the ratio, obviously, between the thickness of

a dime and a length of 10 miles, or about the distance along Central Avenue from Tramway to Old Town.

(LAB NEWS, incidentally, uses the spelling "metre" rather than "meter" for two reasons: to differentiate between the primary metric unit of length and a device that measures something, like a water meter; and to follow the precepts of the American Society for Testing and Materials' "Standard for Metric Practice.")

By controlling the carbonization temperature, Alan has prepared carbon foams with electrical properties ranging from insulating to metal-like conductivities. "If you drop one of these carbon foams on a table, you hear a metallic ring — the same as if you had dropped a dime," he says. "Also, the open space in these carbon foams can be filled with various polymers to make structural composite materials with controlled electrical properties." A patent is pending on these new conductive composites.

Carbon foams are also being investigated as electrodes for batteries because of their controllable electrical conductivity properties and high surface areas.

Medical Possibilities

Then there are the biomedical possibilities. "There appear to be lots of medical applications for porous polymer foams," says Peter Rand. "Physicians tell us porous or high-surface-area media are very desirable for a number of things."

In collaboration with Dr. Paul Mann of the UNM School of Medicine, Sandia is exploring the possibility of using the foams in vascular grafts and artificial veins. Dr. Mann has learned how to grow

endothelial cells, which line the body's entire vascular system, on porous polymers — leading to the possibility of artificial veins. A vein-like tube of foam material could be made from a biocompatible polymer; then endothelial cells could be grown on it.

"If you have a support on which you could grow endothelial cells," says Peter, "you would have a surface that would look very natural — and compatible — to the body." The ability to carefully control foam morphology (that is, size and shape of the cells) may be especially useful for this application, Peter notes. "If it proves necessary," he says, "we could produce a vein-shaped material that gradually varies in cell size from the inside to the outside layers."

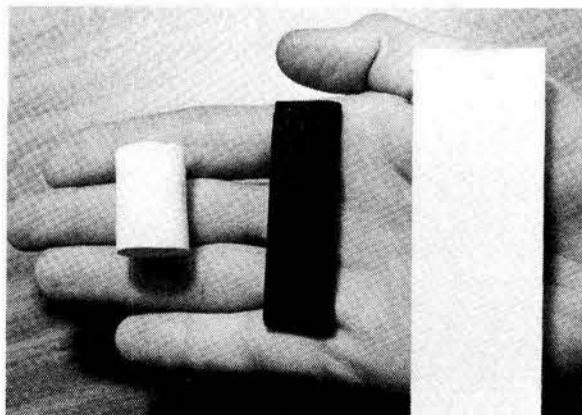
MDs at UNM have also suggested other possible uses for the foams: controlled drug release (because of the high surface area), nerve regeneration pathways, even artificial skin.

Comet-Dust Collector

Jim Aubert and other Sandians also met recently with representatives of the Jet Propulsion Laboratory (JPL) to discuss use of microcellular polymer foams for collecting comet dust. Envisioned are spacecraft on comet fly-by missions that would collect dust and then rendezvous with the space shuttle for return to earth. (Foams have proved more successful for dust collection than solid, liquid, or even gas traps.)

According to JPL, the wall thickness of a foam should be much less than the size of the particles to be collected. For instance, to collect dust less than 100 micrometres in diameter requires a microcellular foam whose wall thickness is much less than 100 micrometres. For evaluation purposes, Sandia will provide JPL a variety of foams; one — polyacrylonitrile — has a cell size of about 0.5 micrometre. "We hope such foams will be able to capture comet dust in the size range of 10 to 100 micrometres," says Jim.

"We're continuing our work on microcellular foams, and look forward to seeing other applications surface in the future." ●PW/Ken Frazier (3161)



THREE IN THE HAND — Machined cylinder of polystyrene at left has 0.1 micrometre-sized cells, while black carbon foam sample and polystyrene rectangle have cell sizes of 0.5 and 10 micrometres, respectively.

(Continued from Page One)

Containment

28. By afternoon the structure had reached the 46-lb. psi design pressure and surpassed it.

Pressurization continued all that night and through the next day. By evening, sensors showed that, at 138 lbs. psi, the structure was leaking slightly. The team raised the pressure to 145. After about an hour at that pressure, the leak was severe enough that pressure couldn't be maintained, and the test was halted. The primary cause of failure was a 20-in.-long tear in the structure's interior steel liner.

"We learned two things right away," says Dan Horschel (6442), the experiment's project leader. "We learned that the structure didn't fail catastrophically, and that these buildings have a capacity far beyond their design levels."

"We were very pleased with the quality of the data," says Walt von Reisemann, "and since the model is essentially intact, we have a golden opportunity to examine the distress regions. Many Sandians helped in various phases of the project; we received excellent cooperation from both technical and administrative organizations at the Labs."

The test, which cost some \$4 million, provided massive amounts of data that will be analyzed over the next few months. And there's a bit of competition going on here — scientists and engineers from ten organizations in the U.S. (including Sandia), France, Italy, West Germany, and the U.K. had submitted computer predictions of what would happen and at what pressures (see "Predictions Mesh"). The data analysis phase will determine whose model most accurately predicted the intricate subtleties that led to failure.

Implications for the Industry

"Our data analysis should give the industry and its regulators a clearer picture of the most likely timing, mode, and location of damage to containment structures that see high pressures," says Dan. "And that knowledge, in turn, should help them define more precisely the potential consequences of accidents, the techniques and equipment that would limit their severity, and prudent emergency plans."

"This test and the smaller-scale ones that preceded it epitomize the Sandia approach to a challenging problem; they also point to the important role of Sandia's groups that support the work of the NRC," notes Dan Hartley (6000). "It's a seldom-recognized task, but it addresses issues that are central to the NRC's role. And our people do a first-class job — they demonstrate a high level of technical integrity." ●BH/Ken Frazier (3161)



AT THE PRESS CONFERENCE preceding the tour, reporters were briefed on the containment test by Walt von Reisemann, supervisor of Containment Integrity Div. 6442 (left), and Dan Horschel, containment test project leader. Press tour and conference were staged by Ken Frazier (3161).

Predictions Mesh On Overall Structural Response

Pretest predictions for the concrete containment model came from a diverse background of interests — industry groups, national laboratories, and regulators. Analysts from each of the 10 organizations spent about a year on the calculations, which were published in a Sandia report in June.

"Before the report was published, the analysts communicated very little among each other," says David Clauss (6442), who will study the predictions in detail in coming months. Lack of communication was purposeful, so that independent assessments could be obtained from each group.

Given the diversity in analytical approaches taken (seven different computer programs were used, for example), David says the predictions for overall structural response, such as radial displacement of the cylindrical shell, were in quite close agreement and accurately reflected the measured behavior.

However, evaluating containment performance — the pressure, location, and mode of failure — proved more difficult; it was there that interpretations sometimes diverged. Predicted failure pressures ranged from 130 to 190 pounds per square inch; the actual maximum test pressure was 145 psi.

Nobody 100 Percent Accurate

"No organization was able to predict the response or the performance of the model with 100 percent accuracy," says David. "Everybody

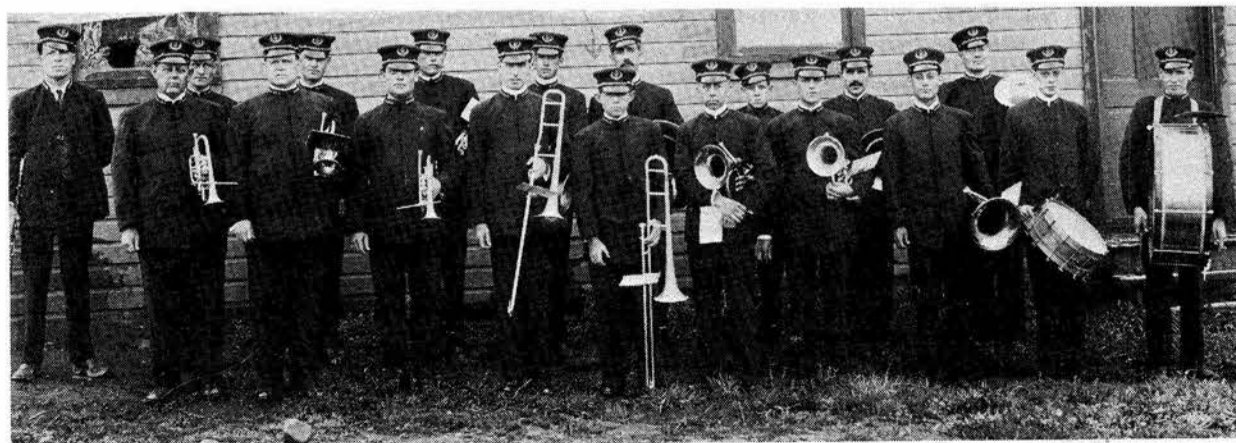
had some shortcomings. Our detailed analysis over the next several months won't focus only on failure pressures predicted, but also — and perhaps more importantly — on what the predictions had to say about where, how, and why the failure would occur.

"Though overall performance was accurately predicted, much of the localized behavior, particularly around openings, was not anticipated," David notes. "The behavior of the materials — cracking and crushing in the concrete, yielding of the rebars, and bonding and slippage between steel and concrete — introduces significant complexities into the calculations."

Besides Sandia (whose calculations were made by Randy Weatherby, 1521), organizations that came up with pretest predictions are Argonne and Brookhaven national laboratories, Electric Power Research Institute, Commissariat a L'Energie Atomique (France), Central Electric Generating Board (U.K.), ENEA (Italian equivalent of NRC), Gesellschaft fuer Reaktorsicherheit (West Germany), HM Nuclear Installation Inspectorate (U.K.), and U.K. Atomic Energy Authority, Safety, and Reliability Directorate.

"Data obtained during the containment model test should lead to substantial improvements in computer programs used for calculating containment response," says David, "especially under severe accident loads. Test data will also help analysts to better interpret the calculations." ●PW

Favorite Old Photo



LOOK, MOM, NO GUITARS — I come from a musical family in Marble, Colo. (named for its marble quarry). This is the Marble band in 1910: my father (fourth from right) and his baritone; his brother, Oscar (the shorter trombone player in the center); and my grandfather (second from left), the bandleader. Unfortunately, the musical talent skipped a generation — none of my father's children has any particular musical talent. But his grandchildren (who took lessons from him) are quite talented.

—Jack Tischhauser (2850)

Retiree Deaths

Margaret De Cou (91)	March 10
Kermit Schuette (77)	April 13
Orville Rowin (75)	April 14
Allen Hobbs (70)	April 22
Audrey Simpson (66)	April 28
William Carter (77)	May 6
Andrew Fry (79)	May 10
Robert Bleakney (79)	May 19
Nathan Purington (85)	May 23
Mary Williams (87)	May 28
Ruby Groll (87)	June 5
Lester Bierly (83)	June 5
Chester Eaves (73)	June 6
Benjamin Slesinger (81)	June 8
Robert Grover (64)	June 8
Charles Fletcher (68)	June 10
Spencer Schwarz (76)	June 18
Herman Nieto (71)	June 23
Orval Wallen (72)	June 24
Naomi Wynant (82)	June 28

High Honor Goes to Sandian For Outstanding Safeguards Work

J. D. Williams (5260A) has been in the safeguards/security business for a long time — 13 years, to be exact. Last month, in recognition of J. D.'s expertise in physical protection technology, the Institute of Nuclear Materials Management presented him its Distinguished Service Award, the Institute's highest honor, at INMM's 28th Annual Meeting in Newport Beach, Calif.

This was the 12th time the DSA has been awarded since it was established in 1979.

J. D.'s award cites him "for his world-renowned recognition as a security expert through the development and application of intrusion detection sensor technology, and for his many personal contributions to the Institute."

J. D.'s reaction? "I was flabbergasted," he says.

He shouldn't have been, says Jim Jacobs (5260), who himself received the DSA two years ago at INMM's annual meeting in Albuquerque. "I don't know of anybody who's worked harder in this [physical protection] arena than J. D. has," says Jim. "He's put together all kinds of intrusion detection and assessment ideas that have been used by many security designers — not just in the U.S., but in foreign countries too. J. D.'s enthusiasm and his dedication to the advancement of physical protection technology rubs off on everyone around him."

One of J. D.'s early projects, the Intrusion Detection Systems Handbook, is used by security people here and abroad. The handbook's regarded by many as the "bible" for the design of intrusion detection systems.

Active in INMM

J. D., like many others at Sandia, has taken a very active role in INMM, which is the "premier organization for professionals in the business of managing nuclear materials," according to Bill Myre, Director of Nuclear Security Systems 5200.

"Because it's an international organization,

INMM is our window to the world for technology transfer of safeguards and security technology," says Bill. "We're pleased that J. D. and others at Sandia have supported the Institute in many different ways — as national officers, as contributors of papers at INMM meetings, and in other capacities as well."

J. D. has been a member of INMM since 1976, and a Senior Member since 1985. He's been chairman of the organization's Physical Protection Technical Working Group since 1981. The group organizes and conducts several workshops per year on topics such as intrusion detection, closed-circuit TV assessment, entry control systems, positive personnel identification, contraband detection, and active and passive barriers. The most recent workshop, "The Use of Computers in Security," was held at Oak Ridge, Tenn., last March.

J. D. was also recently appointed to the International Electrotechnical Commission's Working Group on Alarm Systems. The Commission, composed of members from nine European countries, Japan, and the U.S., prepares performance standards

for intrusion detection sensors.

Sandia support of INMM stretches back into the mid-70s, when the 5200 directorate was formed to work on safeguards technology. Joe Stiegler (then 5250, now 6320) was annual meetings arrangements chairman in the late 70s. Tom Sellers (5250) served on INMM's Executive Committee (Board of Directors).

Currently, Dennis Mangan (5217) is a member-at-large of the Executive Committee. He's also served on the Institute's Technical Program Committee, and has been arrangements chairman for the annual meeting the past three years. "Sandia was very well represented at the Newport Beach meeting," says Dennis. "Of the 172 technical papers or poster sessions, Sandians authored or co-authored 32. And through the years, Labs people have presented a minimum of seven or eight papers at every annual meeting."

And the years to come? Interesting, according to J.D. "There's an exciting future out there in safeguards technology." ●PW



J. D. WILLIAMS (5260A) displays the Distinguished Service Award he received from the Institute of Nuclear Materials Management last month.

Take Note

Shirley Wallace (132) was elected president of the Albuquerque Chapter of the National Association of Black Accountants (NABA) from FY87 through FY88. Hugh Jones (1800) was elected NABA vice-president.

* * *

"Black Wisdom and Beauty, an Evening of Black Culture," directed by Gary Shepherd (2614), will pull out the stops at 7:30 p.m. on Aug. 21 & 22 at the First United Methodist Church (4th & Lead SW). Included in the program are a 1930s vaudeville routine, an original drama written by a member of the ensemble, singing, dancing, fashion, and other elements of black culture. Admission is \$3, children 12 and under free. For more information, call Gary at 4-1450.

* * *

Women new to Sandia — and those that have been here awhile — are invited to join the Sandians, a women's club that provides educational and social activities, and introduces newcomers to Albuquerque. Membership is open to employees, contractors, and wives. General meetings are held the first Monday of each month at a member's home and include a speaker or general-interest program. Interested women are invited to a get-acquainted picnic on Aug. 28 at 5 p.m. at the Coronado Club. For more information, contact Margie Lappin at 296-3457.

* * *

Here's a chance to join the group of specially trained volunteer teachers (docents) at the New Mexico Museum of Natural History. All that's required is a positive, outgoing attitude and an interest in providing Museum visitors with insight into natural

history and the Museum exhibits. Attend an orientation meeting on Aug. 24 at 9 a.m. or 7 p.m. (choose either) at the Museum (1801 Mountain Rd. NW). Training begins the week of Sept. 14. Classes meet two days a week with a choice of morning or evening sessions. For more information, call Peggy Bechtel at 841-8837.

* * *

Ants, stay away! OPEIU has scheduled a picnic — to be an annual event — for tomorrow at the Spanish Village at the NM State Fairgrounds from 2 to 6 p.m. Food (Powdrell's), drinks, door prizes, games, piñatas for the kids, music, clowns, and magicians will be provided. Free tickets were mailed to union members; tickets for guests and children ages 12 and over can be picked up at the gate for \$2/ea. Union members who haven't received their free tickets should call Delores Molina, Vi Salas, or Emma Hindi on 255-8101.

The Fat's in the Fire



Diet books are too elusive in their reworking of language... For the academically minded, there's *The Rutgers Guide*, which suggests something irrelevant like rah-rah or maybe raw-raw. And I suppose if you wanted to look like Linda Evans you would try *The Beverly Hills Diet*.

I've thought of quite appropriate titles for three diet books I plan to write. The first, for the chubby person like myself who is unlikely to lose weight, is *How to Keep Your Double Chins Up*. The second, for a wider audience: *The Diet Isn't Over Until the Fat Lady Swings*.

The last book is for businessmen. It will be entitled *Mid-dle Management*.

Thomas DiBacco, Wall Street Journal



FRED JARAMILLO, Career Services for the Handicapped employee, repairs pallets used for moving and storing material at Sandia. Despite having one arm, Fred "pounds a mean nail," according to Frank Gallegos, supervisor of Shipping and Receiving Division 3428. Pallet recycling means a big cost saving for Sandia, since it's much cheaper to repair them than to buy new ones. More important, the recycling project provides Fred and others with meaningful and productive work while reaffirming Sandia's commitment to provide equal opportunity to people with disabilities.

Events Calendar

Aug. 14 — Concert, Argentinian composer/performer Astor Piazzolla and his New Tango Quintet, presented by the Santa Fe Chamber Music Festival; 8 p.m., free, Rio Grande Zoological Park, 1-983-2075.

Aug. 14-16 — Exhibit, "The Classic," Western art; 1-5 p.m., Fine Arts Gallery, NM State Fairgrounds, free, 265-1791.

Aug. 14-23 — "Flowers for Algernon," play by David Rogers based on the novel by Daniel Keyes; 8 p.m. Thurs.-Sat., 6 p.m. Sun.; Keystone Theatre (3211 Central NE), 255-6819.

Aug. 14-23 — "Seascape," Edward Albee play; 8:30 p.m., Corrales Adobe Theatre, 898-3323.

Aug. 14-25 — Exhibit, paintings by Felix Vigil of Jemez Pueblo; 9 a.m.-6 p.m., Gallery, Indian Pueblo Cultural Center, 843-7270.

Aug. 14-30 — "What I Did Last Summer," comedy by A. R. Gurney; 7:30 p.m. Fri. & Sat., 2 p.m. Sun.; Albuquerque Little Theatre, 242-4750.

Aug. 14-31 — Exhibit, "After Bosque Redondo: Navajo Weaving of the Transitional Period, 1880-1910"; 10 a.m.-6 p.m., Adobe Gallery (413 Romero NW), 243-8485.

Aug. 14-31 — Exhibit, "From the Center Place: Contemporary Zuni Pottery and Its Makers"; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat.; Maxwell Museum of Anthropology, 277-4404.

Aug. 14-Sept. 6 — "All Men Are Whores," an evening of plays by David Mamet; 8 p.m. Fri. & Sat., 6 p.m. Sun.; Vortex Theatre, 247-8600.

Aug. 14-Sept. 10 — Watercolor exhibit by "The Wednesday Group," artists who meet on Wednesdays and travel to various places in NM to paint scenes of the outdoors; 8:30 a.m.-5:30 p.m. Mon.-Sat. (8:30 a.m.-8 p.m. Wed.), South Broadway Cultural Center, 848-1320.

Aug. 14-Sept. 20 — Exhibit, "Raymond Jonson: The Fifties," 37th Annual Summer Exhibition; 10 a.m.-5 p.m. Tues.-Fri., 1-5 p.m. Sat. & Sun.; Jonson Gallery, 277-4967.

Aug. 14-Sept. 20 — Exhibit, Clinton Adams retrospective; 10 a.m.-5 p.m. & 7-10 p.m. Tues.-Fri.,

1-5 p.m. Sat. & Sun.; upper gallery, UNM Art Museum, 277-4001.

Aug. 14-Oct. 4 — Focus Photo Series: Ted Kuykendall Photographs; 10 a.m.-5 p.m. Tues.-Fri., 1-5 p.m. Sat. & Sun.; Albuquerque Museum, 243-7255 or 242-4600.

Aug. 15 — Concert: Veronica Ortiz, Musica Folklorica, Jaime Chavez, Poesia; 8 p.m., free, South Broadway Cultural Center, 848-1320.

Aug. 15 — Los Reyes de Albuquerque, Hispanic folk music, sponsored by the Albuquerque Bicentennial Diamond Jubilee Committee; 8 p.m., KiMo Theatre, 768-4549.

Aug. 15 — San Antonio Feast Day, harvest and social dances; Laguna Pueblo, 552-6654.

Aug. 15 — Our Lady of Assumption Feast Day, Corn Dance; Zia Pueblo, 782-4481.

Aug. 15 — Summerfest '87: Polish Night; 5-10 p.m., Civic Plaza, 768-3490.

Aug. 15 — New Mexico Clogging Association Annual Convention; 9 a.m. & 1 p.m. workshops, 7 & 10 p.m. exhibitions; 4H Building (1500 Menaul NE), 296-0453.

Aug. 16 — Arts in the Parks: The Ramblers, John Polinko and Magic with Animals, and Sophia and Sanxi and Brazada; 2-4 p.m., Ridgecrest Park (Ridgecrest & Burton SE), free.

Aug. 16-Nov. 1 — Exhibit, "The African Desert: Photography by Bernard Plossu"; 11 a.m.-5 p.m. Tues.-Fri., 1-5 p.m. Sat. & Sun.; Albuquerque Museum, 242-7255.

Aug. 17-31 — Bicentennial Exhibit, "Are We to Be a Nation," by New York Public Library about writing of the Constitution; 9 a.m.-9 p.m. Mon.-Thurs., 9 a.m.-5:30 p.m. Fri. & Sat.; Main Albuquerque Public Library, 768-5116.

Aug. 18-25 — World Paint Horse Show; 8 a.m., 1:30 & 7 p.m.; NM State Fairgrounds, free, 243-3696.

Aug. 19 — "Tops in Blue, A Musical Tribute," Air Force entertainment showcase; 7 p.m., Kiva Auditorium, free, 844-5420.

Aug. 19 — "Who Killed Don Jose?" (murder mys-

tery by Rudolfo Anaya), presented by La Compania de Teatro de Albuquerque; 7:30 p.m., free, South Broadway Cultural Center, 848-1320.

Aug. 19-21 — New Mexico Film Festival: "Pueblo Legend," "When the Legends Die," "Lonely are the Brave," and "The Lone Ranger"; 7:30 p.m., KiMo Theatre, 768-4549.

Aug. 21 — Noontime Concert: Bayou Seca, Cajun and New Mexico music; noon-1 p.m., Civic Plaza, 768-3490.

Aug. 22 — Summerfest '87: Cajun Night; 5-10 p.m., Civic Plaza, 768-3490.

Aug. 22 — Concert, Santa Fe Quintet, presented by Santa Fe Chamber Music Festival; free for senior citizens, 5 p.m., Keller Hall, 1-983-2075.

Aug. 22-23 — Master Gardener Educational Fair and Plant Sale: lectures, exhibits, and displays; 10 a.m.-4 p.m., Albuquerque Garden Center (10120 Lomas NE), 296-6020.

Aug. 23 — Team Roping, 10 a.m.-4 p.m., Bernalillo County Sheriff's Posse Arena (Edith & El Pueblo Rd. NE), free, 898-7898.

Aug. 23 — Zoo's 60th Birthday Party: cake, ice cream, hot dogs, prizes, clowns, and music; 3-6 p.m., Rio Grande Zoological Park, 843-7413.

Aug. 23 — Arts in the Parks: Doctor Jazz, Michael Blum, The New Mexi-Chords, Linda Cotton and Streetlife; 1:30-4 p.m., Mary Fox Park (13th St. & Roma), free.

Aug. 23 — Sunday Jazz at Madrid: Richie Cole, Eddie Harris, Pete Amahl Trio, and Pedro Hernandez and Caribe; 3 p.m., Oscar Huber Memorial Ballpark (Madrid), 842-6659.

Aug. 24-31 — Exhibit, "Art for the Blind: Basic Shapes by Paul Re"; 10 a.m.-5 p.m. Tues.-Fri., 1-5 p.m. Sat. & Sun.; Albuquerque Museum, 242-4600.

Aug. 25 — Lecture, "People of Chaco," by Ken Frazier (3161); 7:30 p.m., Maxwell Museum of Anthropology, 277-4404.

Aug. 28 — Crownpoint Rug Auction; 3 p.m. rug viewing, 7 p.m. auction; Crownpoint Elementary School, 786-5302.

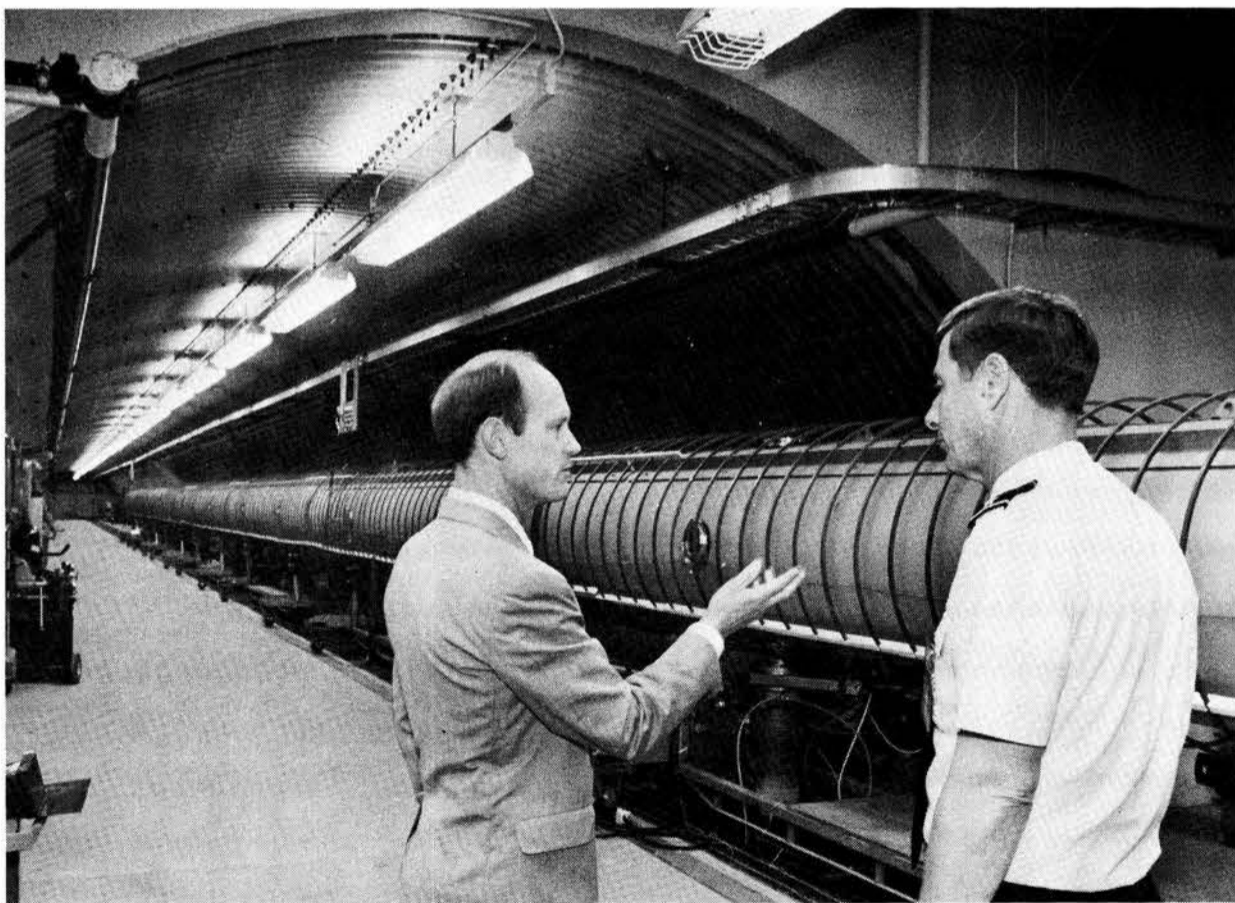


Here are a few current volunteer opportunities for employees, retirees, and family members. If you would like more information, call Karen Shane (3163) on 4-3268.

ALBUQUERQUE ACADEMIC DECATHLON will be held Feb. 20. Each APS high school will field a team of six students from 11th and/or 12th grades to participate in the one-day program. The winning Albuquerque team will attend national competition in the spring. Volunteers are needed to meet with the teams and their coaches and give one-to-two hour presentations in math, physics (kinematics, dynamics, momentum, mechanical energy, light, and vibrations, waves and sound), health, fine arts, etc. Also, there will be a "super quiz" on "The History of Flight: From Daedalus to Kitty Hawk to Voyager."

CHAMBER ORCHESTRA OF ALBUQUERQUE is holding its second annual Turquoise Trail bicycle tour from Albuquerque to Madrid on Sunday, Sept. 20. COA is looking for volunteers to help at registration and rest stops and to drive sag wagons. Also, medical personnel (technicians, nurses, physicians) are needed at various route sites.

MAXWELL MUSEUM OF ANTHROPOLOGY at UNM is looking for volunteer docents for weekday assignments either at the museum or in classrooms.



LT. GEN. JAMES ABRAHAMSON, director of the Strategic Defense Initiative organization in Washington, D.C. (right), recently visited Sandia for a half-day briefing on Labs SDI activities. Here, he discusses the EPOCH (Electron Propagation On CHannels) facility in Area IV with Ron Lipinski, supervisor of Directed Beam Research Division 1274. EPOCH's used for studies to determine how to propagate electron beams stably for SDI and other projects.

Congratulations

To Angelina Lopez and Howard Littell (5165), married in Socorro, July 11.
To Christi and Scott (3718) Searls, a son, Owen Turner, July 14.
To Beverly and Martin (5143) Imbert, a son,

Christopher Eugene, July 27.
To Terri and Bill (6425) Camp, a daughter, Suzanne Lorraine, July 29.
To Isabel (7861) and Richard (7841) Goodson, a daughter, Bethany Alise, July 30.

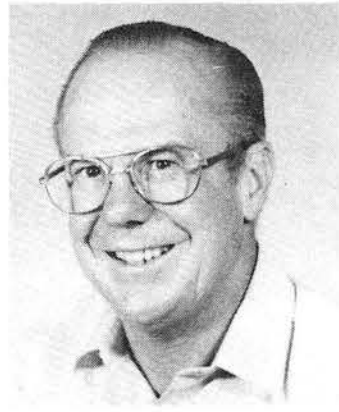
MILEPOSTS

LAB NEWS

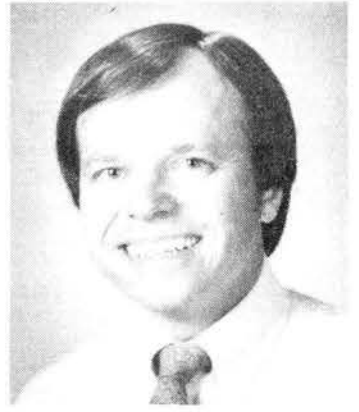
AUGUST 1987



Charles DeCarli (8479) 25



Paul Fjelseth (9144) 30

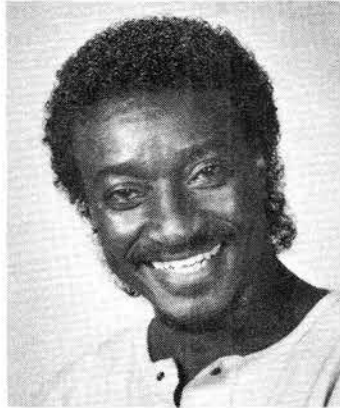


Bob Bastasz (8347) 10

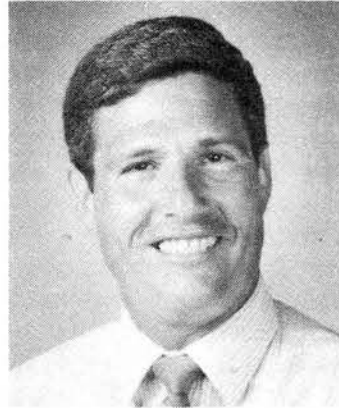


Dick Schwoebel (1800)

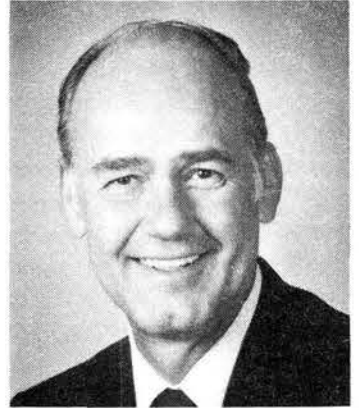
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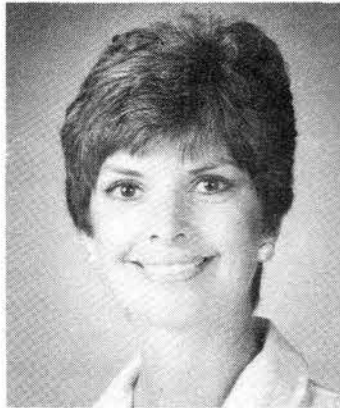
Everitt Davis (8464) 20



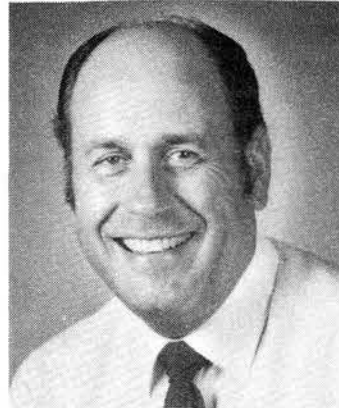
Mike Birnbaum (8242) 20



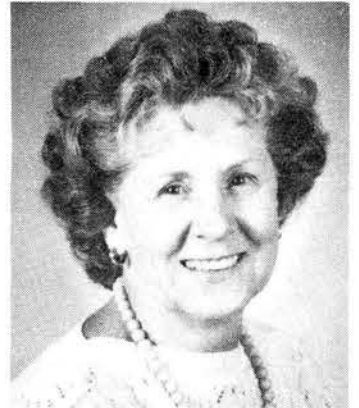
Otto Schreiber (8479) 30



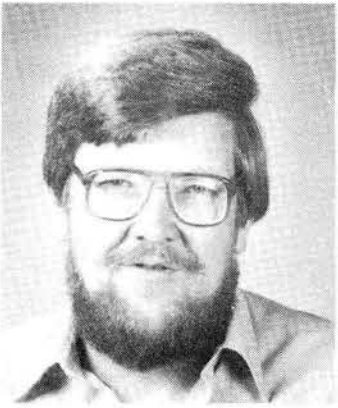
Barbara Combs (8161) 10



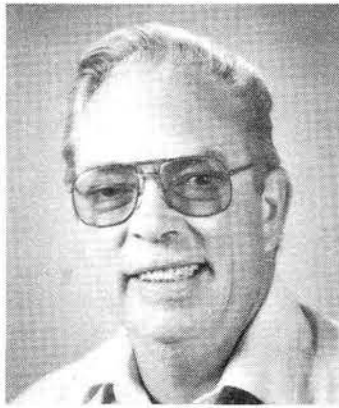
Roger Everett (8152) 25



Doris Pouard (8024) 25



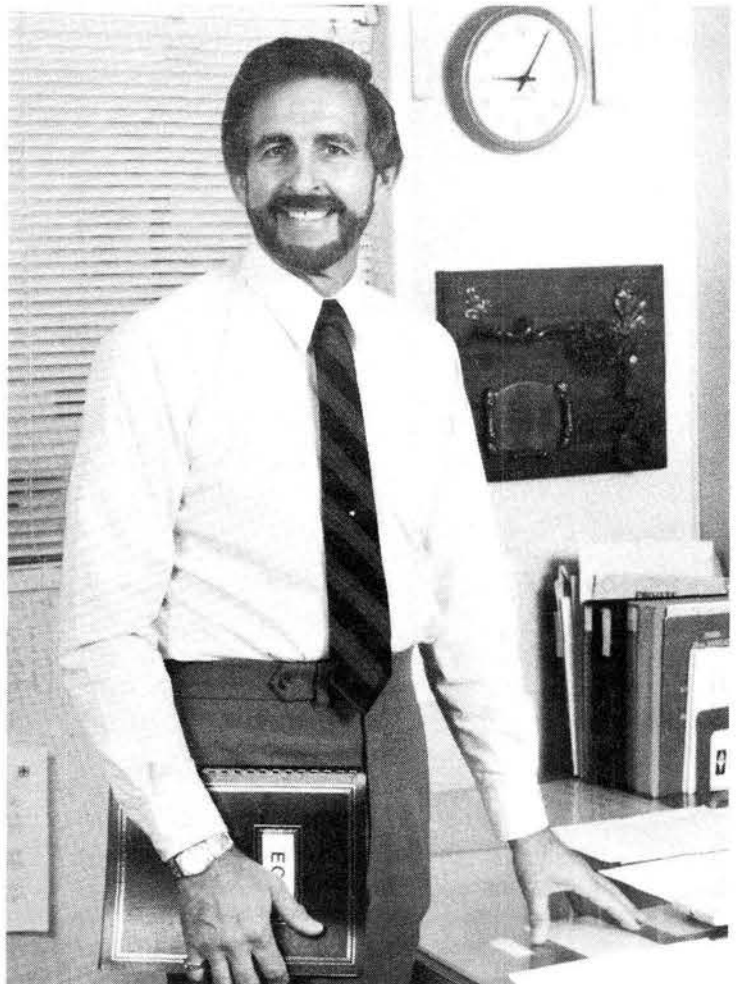
Al Salmi (8361) 15



Ken Byrne (8163) 30

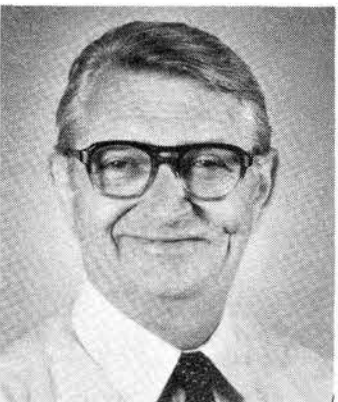


Carolyn Pura (8434) 10

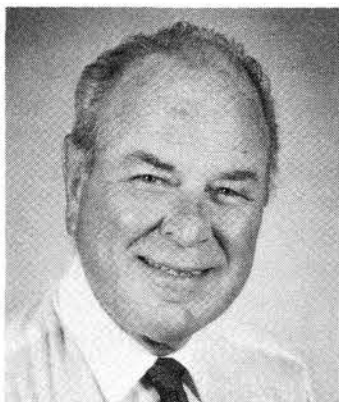


Marlin Pound (8261)

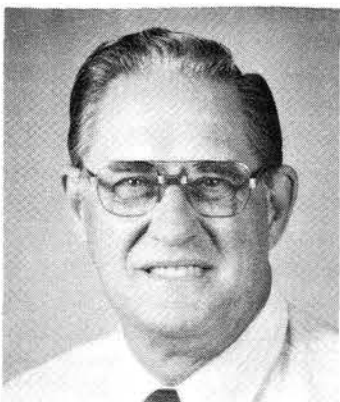
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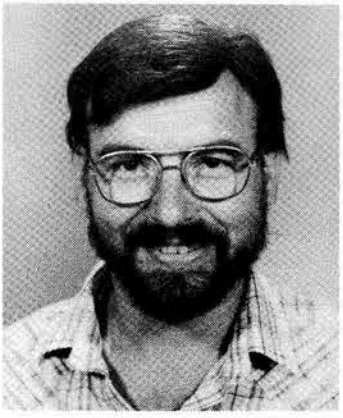
Don Adolphson (8441) 30



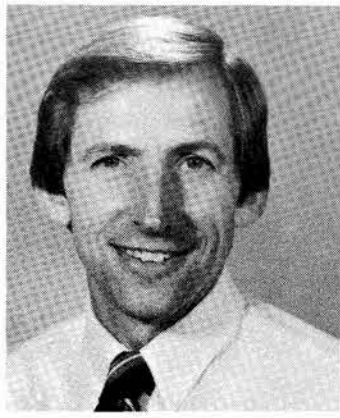
Mac Spivey (8133) 35



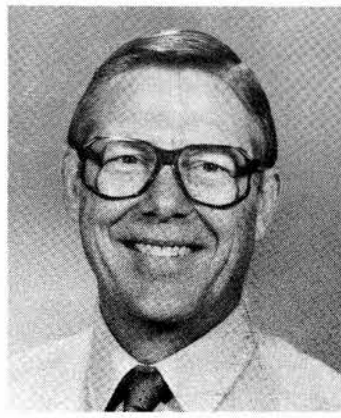
Gordon Miller (8235) 35



John Dunton (7483) 10



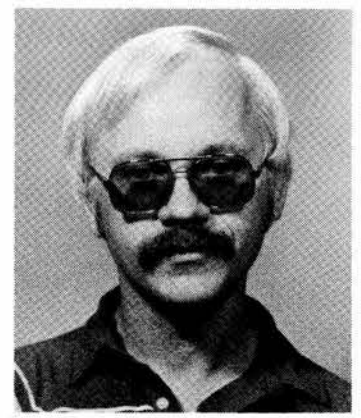
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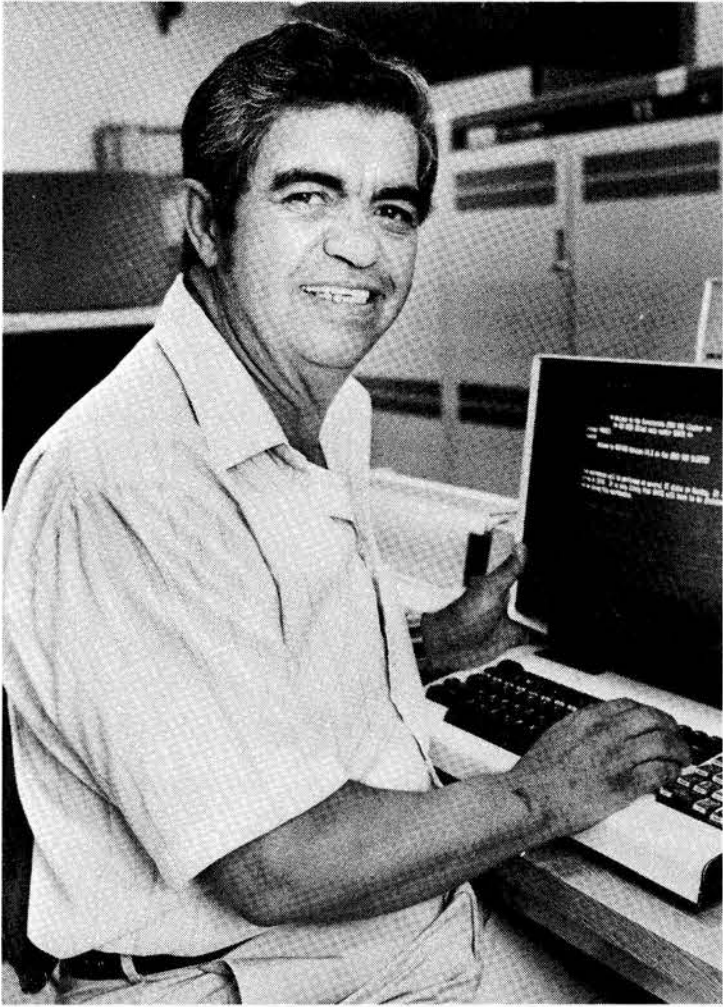
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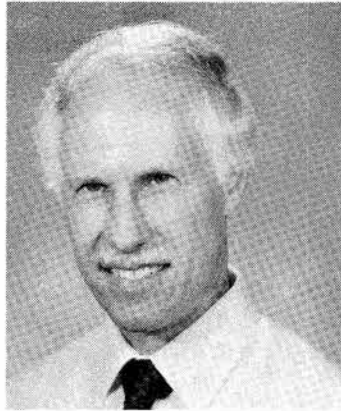
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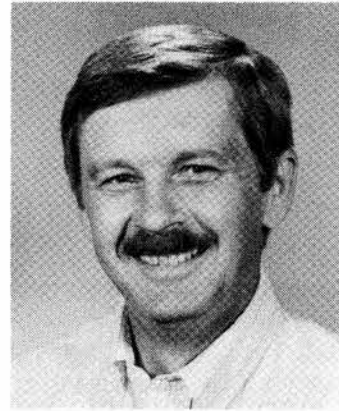
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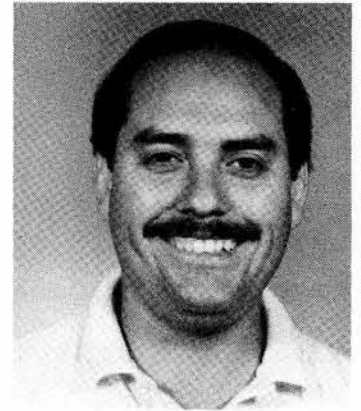
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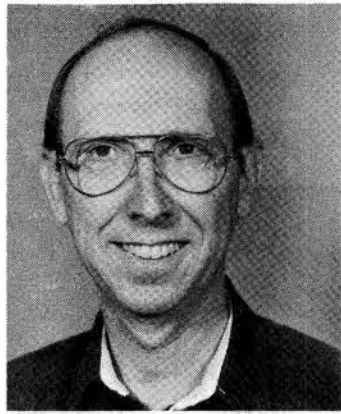
Keith Treece (2115) 25



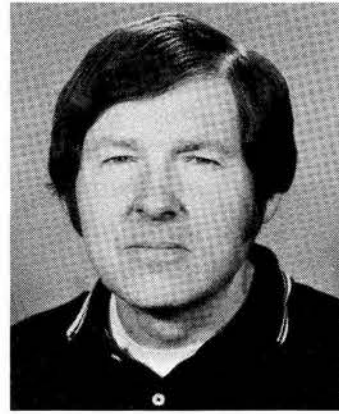
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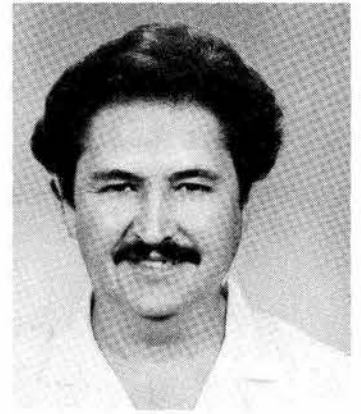
Nick Sanchez (3154) 10



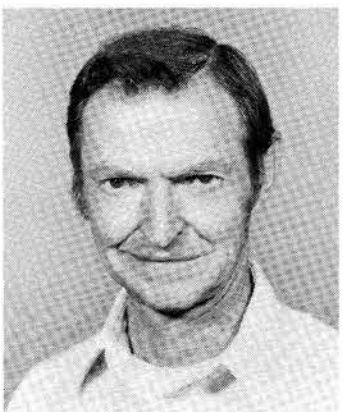
Ron Jones (2644) 20



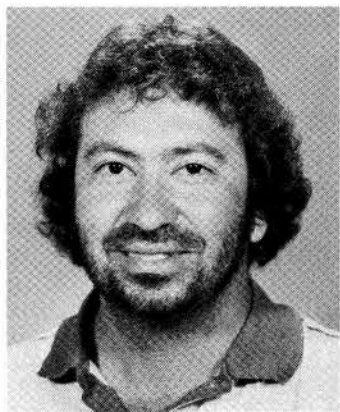
Ron Hadley (1124) 15



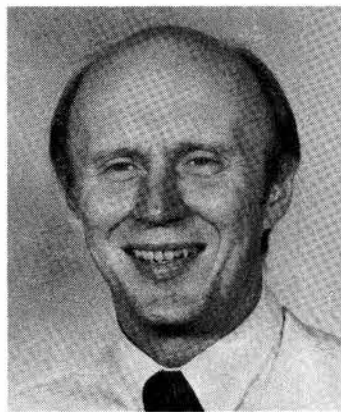
Art Montano (7473) 10



Irving Hall (7223) 20



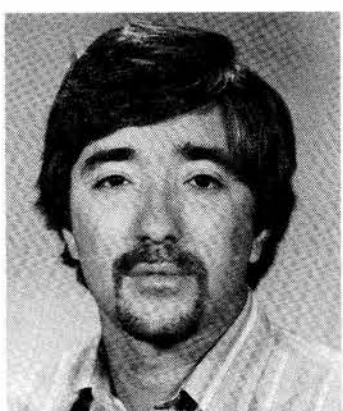
Larry Garcia (3425) 10



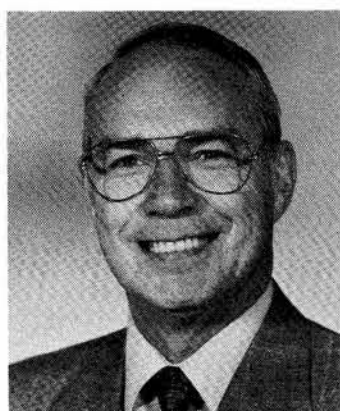
George Novotny (5166) 20



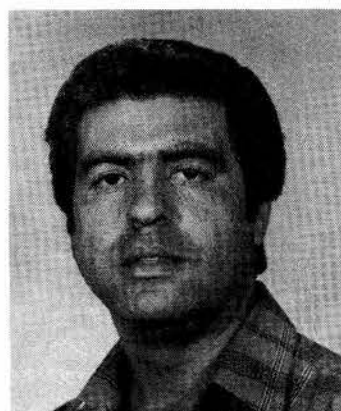
Jerry Hood (7250) 30



Leroy Garcia (3154) 10



Kal Palmer (121) 20



Frank Padilla (7812) 20

Attention, Sagebrush-Shuffle Stompers: Shake a Leg Next Friday

OLD COWHANDS FROM THE RIO GRANDE gather next Friday (Aug. 21) for another wild 'n wooly Western Night. Start things out with the two-for-one chuck wagon dinner special, featuring filet mignon or fried shrimp (your choice of two entrees, \$14.95). Then amble on out to the dance floor (stomp shoes recommended), where those famous Isleta Poor Boys preside from 8 p.m. to midnight. The sooner the better on that dinner reservation (265-6791), because the Isletans always pack the place.

IT'S CHA-CHA TIME tonight, as the Freddie Chavez Foundation gives you Latin music lovers all the support you need for four hours, starting at 8 p.m. Ahead of time, get fortified for those rhythmic rumbas with some elegant dining; the two-for-one menu includes prime rib or scallops. It's probably not too late to make a reservation if you call this very minute.

A BRUNCH OF FUN is waiting for you and the family when you come out this Sunday (Aug. 16) for the best buffet in town. Served from 10 a.m. to 2 p.m., the mouth-watering menu features baron of beef, fried chicken, turkey, tossed salad, corn O'Brien, hash browns, pancakes, Denver omelets, and an assortment of cakes and puddings. Accompaniments include salsa, juices, coffee, tea, milk, and (of course!) a complimentary glass of wine or champagne. If you're looking for a bargain, this is it — the cost is \$5.95 for adults, \$3 for children from 4 to 11, and free for ankle-biters under 4. Flash your C-Club membership card and take a dollar off the tab (discount limited to \$2/family). So what are you waiting for? Reservation people are standing by.

WHEELING AND DEALING are specialties of the T-Bird card players, and they swing back into action next Thursday (Aug. 20), beginning at 10:30 a.m. You can bet your last buck that shuffling off to Buffalo isn't on *this* group's agenda; tickets to Tinsel Town are more their style. Head shark Jim McCutcheon tells us that, as usual, there'll be free coffee, cookies, and door prizes along with the gaming.

SPEAKING OF THUNDERBIRDS, these retired — but not retiring — folks get together next Tuesday night (Aug. 18) for another patio party. From 6 to 8 p.m., feast on fantastic food from the a la carte, alfresco BBQ buffet. Meantime, the T-Birds' favorite music man, smilin' Bob Banks, provides mel-low tunes from 7 to 10 for listening or dancing.

YOUR LAST CHANCE of the summer to enjoy pool family night comes up Wednesday, Aug. 26, from 6 to 9 p.m. Cancel your culinary captivity that night; the snack bar and grill, open all evening, serve up all kinds of people-pleasin' food: burgers, hot dogs, nachos, and a variety of beverages. Meantime, beat the heat with a dip in the coolest pool around. Regular admission rates: free for pool pass holders, \$1/person for Club members without passes, and \$2/person for guests.

DON'T FENCE ME IN is the motto of the T-Bird Roadrunners as they hit the road again from Aug. 25 to 27. This time the gang heads north to El Vado Lake. Details from wagon masters Duane Laymon (822-1749), Tom Brooks (344-5855), or Bill Minser (299-1364).

VERY SPECIAL ENTERTAINMENT'S in store for a bunch of lucky people on Friday, Aug. 28. From 7:30 to 8 p.m., right after the two-for-one special (prime rib or scallops), Angela Simoni and Steve Baca of Dance Studio I present a sizzling jazz dance show, "Jazz Le Hot." This one's not to be missed; even you jazz buffs may learn a thing or two! Afterward, Michael Ray and Spectrum play a dazzling



"JAZZ LE HOT," starring Angela Simoni and Steve Baca of Dance Studio I, takes center stage from 7:30 to 8 p.m. on Aug. 28, right after the two-for-one dinner special. Following the sizzling floor show by Angela and Steve, Michael Ray and Spectrum provide variety dance music from 8 to midnight.

array of variety music for dancing from 8 to midnight. Dinner reservations highly recommended (and all that jazz).

THANKS FOR THE MEMORY is what people say when they return from those tremendous tours put together by the C-Club Travel Committee. Coming soon:

Paradise Not Lost — Yet. There's good news on the Hawaii trip (Oct. 30-Nov. 9) for all you procrastinators. The deadline for sign-up has been extended to Aug. 21. This one has it all: visits to three islands, first-class hotels, an authentic luau on Kauai,



MIKE IZATT (1244) DEMONSTRATING "kokatsu no morote chudan barai," a stance and hand technique that helped him win second place in the kata (prearranged forms) event at the 25th Anniversary U.S. Karate Association's World Karate Championships held June 27-28 in Irvine, Calif. Mike has been a winning competitor in USKA events since he began his training in 1975. Mike is an Associated Western Universities summer intern in Div. 1244.

all sorts of optional ground tours. The \$989/person (double) price includes RT air fare from Albuquerque, 10 nights' lodging, a lei greeting in Honolulu, the luau, rental car per couple on Kauai and Maui, and much more. A \$100/person deposit by the 21st reserves your space. Learn more about this adventure in Luau-Land at a trip presentation on Aug. 17 at 7 p.m. in the C-Club dining room. You'll get all the details, plus info on ground tour options; door prizes, plus other surprises too!

Photographer Phantasy — If you're looking for some spectacular scenery and a chance to take lots of pictures, this one's the ticket. Hop aboard the Cumbres & Toltec Railway on Sept. 26, and see those high-country aspens at the peak of their fall color. The one-way train trip between Chama and Antonito (Colo.) is a never-to-be-forgotten experience. At the end of the line, you catch a bus for the return trip to Albuquerque. The \$50/person cost (\$38 for children 12 and under) covers RT bus fare from Albuquerque to the train station, train ticket, a continental breakfast, and refreshments along the way. Reserve with a \$25 deposit; final payment not due until Aug. 26.

Think December — That holiday month seems like a long way off, but it really isn't. A weekend in Tinsel Town (translation: Las Vegas) from Dec. 11 to 13 is sure to put you in a festive mood. You'll spend two nights at the Four Queens Hotel and receive "fun books" (whatever *those* are) for other attractions.

Another December possibility is a week-long trip to sunny Florida, including visits to Disneyworld and Epcot Center. Details not yet available, but stay tuned.

Welcome

California

George Dooley (3155)
Joselyne Orlanes (9221)
Scott Rowland (7832)

Ohio

David Arnold (2334)

Oklahoma

Kevin Maloney (6412)

Texas

Greg Haschke (9127)

Oily Prospects for Lasers



Carbon dioxide lasers have found a novel use in the oil industry. Geologists in Japan are using them to burn holes down through the ground instead of drilling.

New Scientist